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limbs and its stiff armor and its habits of burrowing in the mud, where corals do not usually live, it could when "alarmed, shoot with a quick stroke of his tail under cover of some coral crag." We should rather imagine this acrobatic feat performed by a lobster. And by the way the author is at fault in allying the trilobite to the Idotean crustacean, *Glyptonotus antarcticus*, figured on page 322, when its closest ally is the Horse Shoe Crab, *Limulus*. Our author adopts the nebulous hypothesis. How can he logically discard a theory of a gradual development of vegetable and animal forms, since the course of nature is apparently the same in both? Why does he reject a fifth subkingdom of the animal kingdom, the Protozoa? The Laurentian Eozoon scarcely conforms to either one of the Cuvierian types, and must form a fifth "corner stone on which Nature has built the superstructure of the animal creation" (p. 315). We would question whether there is not a successional relation between the four subkingdoms of animals, as much as in the classes of the vertebrates.

The best authorities agree that the *Archæopteryx* was a bird, and not a reptile with feathers. Why in figure 98 does our author arm his primeval man with stone axes when attacking the cave bear? Flint, arrow and spear-heads were a "drug" in the Kjoekkenmoedden market. Would not the use of bows and arrows have been better strategy?

We have been informed that Dr. Koch "the reconstructor of the Tertiary Zeuglodon" (see p. 356) is not a man to be trusted in making scientific statements, or reconstructing skeletons of extinct monsters, as his *Hydrarchus* was fully exposed by Johannes Muller, the great comparative anatomist, and shown to have been composed of the bones of mastodons with a sprinkling of Zeuglodon bones.

HAND-BOOK OF ZOOLOGY.*—In this little manual the author only claims to give a skeleton of the subject, with illustrations taken from species which the student can collect for himself within the limits of British North America, or can readily obtain access to in public or private collections. Fossil animals are included as well as those which are recent, because many types not represented in our existing fauna, occur as fossils in our rock formations; and because one important use of the teachings of zoology is that it may be made subsidiary to geological research." We like this hand-book, notwithstanding what seem to us great defects in the classification of certain groups, and numerous grave typographical errors, both of which could be remedied in another edition. Teachers will find it (when the second part on Vertebrata is issued) the most available book we have in instructing their classes, when books are relied on in teaching a subject where only specimens and oral instruction ought ordinarily to be used. The first and second chapters, on Physiological Zoology and Zoological Classification contain much sound sense, and de-

* Handbook of Zoology; with examples from Canadian species, recent and fossil. By J. W. Dawson, LL. D., F. R. S., etc. Part I. Invertebrata, with 275 illustrations. Montreal. 1870. 12mo, pp. 264. Price \$1 50.

serve to be widely read by a class of half educated "species describers" which vex good naturalists the world over.

We regret that the distinguished author includes the Protozoa in the Radiates, for what radiate feature do the Amœbas, Foraminifera, Sponges and Infusoria possess? Why also are the Tunicates, which homologize so closely with the Lamellibranchs, placed between the Polyzoa and Brachiopods?

We are by no means satisfied with the author's treatment of the class of Insects, comprising in his estimation the subclass Hexapoda and Myriapoda. He considers that there are nine orders of six-footed insects (Hexapoda). He retains the "Aptera" as a distinct order, the types being the Lice and Springtails (Podura, etc.). Now the Lice are proved to be low Hemiptera, and the Springtails are closely related to the Neuroptera, if they do not compose a family of that group. The Coleoptera are regarded as the highest, the Hymenoptera being placed below the Neuroptera even! Notwithstanding all we know of the Fleas, they are also consigned to a separate "order," though proven to be a family of diptera. A very objectionable feature to us is the rank assigned to the Spiders, or Arachnids. They are placed as a "class" above the insects. Their mode of development, their want of a true metamorphosis (except in certain genera of Acarina), their morphology—all convince us that they are inferior to the Hexapoda, and do not show class characters, any more than do the Myriapoda. In his definition of the class the author says "antennæ rudimentary or mandibuliform." The antennæ as proved by anatomy and especially embryology (see Claparède's great work on the embryology of the spiders) do not exist in the Arachnids. The so-called antennæ are the mandibles. What are the "tentacles" in this group, the palpi? Of his order Dermophysa, of which we see no necessity, the Demodex represents a family of the mites, and the Tardigrades are in all probability the types of another and the lowest family of Acarina, while the Sea Spiders (Pycnogonids) are truly crustaceous, as proved very satisfactorily by the able embryological researches of Dr. Anton Dohrn. The Spiders are to our mind higher than the Scorpions and Phrynidæ.

The cuts are for the most part indifferent, and the printing only endurable, while the typographical errors are so numerous, and in some cases so egregious that we suppose the author did not read the proofs owing to his absence in Europe. In a second edition the shortcomings we have plainly alluded to could be easily corrected, and a cheap, practical, very readable and exceedingly useful manual be produced, and one that would deserve a wide circulation.

A NATURALISTS' GUIDE.*—This is an excellent little work—one so good, in fact, that we only wish there were more of it. It is difficult, if not im-

* The Naturalist's Guide in collecting and preserving objects of Natural History, with a complete list of the Birds of Eastern Massachusetts. By C. J. Maynard. With Illustrations by E. L. Weeks. Boston: Fields, Osgood & Co. 1870. (For sale at the Naturalists' Agency. Postage paid \$1.90.